The Impact of the Discovery Learning Model Supported by Pop-Up Book Media on Fourth-Grade Elementary School Students' Cognitive Learning Outcomes in Animal Metamorphosis

Eka Murdiani*, Gregorius Rohan, Rosmaiyadi, Sumarli

ISBI Singkawang, Indonesia

*Corresponding author's email:sumarliphysics@gmail.com

ARTICLE INFO	ABSTRACT
	This study aimed to find out; (1) To find out whether or not there is a difference in students' cognitive learning outcomes between classes that use the Discovery Learning model assisted by Pop-Up Book learning media and classes that use the direct learning model; (2) To determine the influence of the Discovery Learning model assisted by Pop-Up Book learning media on the learning outcomes of the cognitive domain of fourth-grade elementary school students on animal metamorphosis materials; (3) To describe students' responses to the application of the Discovery Learning model Assisted by Pop-Up Book media. The type of research used in this study is quantitative research. This research was conducted at SDN 62 Singkawang. The subject of the study was a fourth-grade elementary school student. The data collection techniques used are test techniques and non-test techniques. The data collection instruments used are question sheets and student response questionnaires. The results of this study show that 1) There is a significant difference in the learning outcomes of the cognitive domain of fourth-grade students between classes that use the Discovery Learning model assisted by Pop-Up Book media and classes that use the direct learning model; 2) The Discovery Learning model assisted by Pop-Up Book media has a high influence on the cognitive learning outcomes of fourth grade students in science learning at SDN 62 Singkawang; 3) Positive student responses to the application of the Discovery Learning model assisted by Pop-Up Book media.

Introduction

Natural Sciences (IPA) is a science that studies nature and the surrounding environment. According to Dasna (2016: 826) because students' initial knowledge has a great influence on students' interest and tendency to learn science. According to Widi and Sulistiyowati (2017:22), science is a group of sciences that has special characteristics, namely the study of factual natural phenomena or events and causal relationships. Science is a science that requires facts or reality about phenomena that occur in nature based on scientific processes through experiments, so to convey a learning material requires objective data, where students really see or know clearly and understand the material taught in order to achieve the learning objectives of the material presented.

In the content of the Independent Science curriculum, it is a subject that has an important role in developing all aspects of the level of student ability in the learning process. Science is part of a subject that is developed based on the achievement of three aspects, namely knowledge, attitude, and skills. Learning outcomes in general are changes in the overall behavior and abilities that students have after learning, which manifest in the form of cognitive, affective, and psychomotor abilities as learning outcomes.

Learning outcomes have a very important position and cannot be separated from the learning process. Learning outcomes are a benchmark for the success of a learning process. With the learning results, teachers can find out whether students have achieved the competencies that have been applied. The learning outcomes focused on this study are the learning outcomes of the cognitive domain where the purpose of measuring the cognitive domain is to obtain accurate information about the achievement of instructional goals by students in the cognitive domain. Anderson and Krathwohl (2010:106) stated that the learning outcomes of the cognitive aspect (knowledge) have several categories, namely: remembering, understanding, applying, analyzing, evaluating, and creating. Measurement of learning outcomes in the cognitive domain is important to improve quality or increase student achievement (Purwanto, 2010:50). According to Wulandari et al. (2021), the importance of the cognitive realm for students in learning science is to be a forum for students to learn about themselves and the surrounding environment so that it can be useful in the life of students.

Based on observations at school, there are students whose cognitive learning outcomes are still low where students have difficulty learning and there are some students who still do not understand the learning material. The Minimum Completeness Criteria set for science subjects is with a score of 65. In accordance with the results of the daily test of science semester 1 grade IV for the 2022/2023 school year, data was obtained for only 8 out of 27 grade IV students of SDN 62 Singkawang whose score was above the minimum completeness criterion, with an average score of 58.1. Based on this data, there are still 19 students who get a score below the minimum completeness criterion (65). This means that student learning outcomes in the cognitive realm are still relatively low in science learning.

Based on information from the four grade teacher of SDN 62 Singkawang, it was obtained that in carrying out science learning activities, they still use a direct learning model, which is a learning model that is more teacher-centered and emphasizes more on the lecture method. Teachers explain more learning materials and students are less active in the learning process. This results in students' ability to understand science concepts to be low.

In addition, in the learning process that takes place, teachers do not use learning media. The learning media used is still limited to textbooks. Students' responses during the learning process are also less enthusiastic about science learning, so that students do not respond to the teacher during science learning and students have difficulty understanding science subjects. During science learning, students often chat with their friends and have more fun on their own, so that students do not pay attention to the teacher when explaining the material.

Based on these problems, one of the learning models that can help make it easier for students to master the learning material well is by using the Discovery Learning learning model. According to Fitri (2015), the discovery learning model is one of the learning models that can improve student learning outcomes through reasoning, finding something for itself in understanding the structure of key ideas. With this learning model, students will be active in participating in learning, so that this knowledge will be stored in students' memories for longer. According to Kristin (2016: 86), the discovery learning model is used to develop an active way of learning by discovering by oneself, investigating oneself, then the results that will be obtained will last a long time in the memory so that it is not easily forgotten by students.

The learning model will be more effective if it is supported by the right learning media. One of the learning media that can be used in science learning with the discovery learning model is the Pop-Up Book learning media. A Pop-Up Book is a card or book that when opened can display a three-dimensional shape or embossed (Dewantari, 2014). This Pop-Up Book is designed to be as attractive as possible so that it is able to improve student learning outcomes in science subjects, of course, in animal metamorphosis materials. This Pop-Up Book learning media also helps teachers in conveying animal metamorphosis material with concrete examples. The use of learning media will make students more active, interested and happy, so that there will be students' enthusiasm for learning. Thus, learning outcomes will increase.

The material applied in this learning medium is animal metamorphosis material. Animal metamorphosis material is material that contains the life cycle of animals such as the life cycle of frogs, butterflies, cockroaches, grasshoppers and mosquitoes. This material is very suitable to be applied in Pop-Up Book media, so that animal metamorphosis material can be conveyed properly and effectively.

The selection of the Discovery Learning learning model in this study based on research by Maharani and Hardini (2017) shows that the application of the Discovery Learning learning model assisted by concrete objects can improve student learning outcomes in the fourth grade science subject of SD Negeri 3 Kemiriombo, Gemawang District, Temanggung Regency in the second semester of the 2017 Academic Year. In addition, research conducted by Anisa et al. (2021) showed that there was an increase in the learning outcomes of fifth-grade students of SDN 1 Kebonadem in theme nine after implementing the Discovery Learning learning model with the help of interactive media. Research conducted by Miasari et al. (2020) stated that there was a significant influence of the environment-assisted Discovery Learning learning model on the learning outcomes of fifth-grade students of Gugu I Melinggih, Payangan District, Gianyar Regency for the 2019/2020 Academic Year.

Based on the problems that have been raised above, the specific purpose of this study is "To describe the influence of the Discovery Learning learning model assisted by Pop-Up Book media on the learning outcomes of the cognitive domain of fourth grade elementary school students on the material of Animal Metamorphosis".

Research Methods

The place of this research is at SDN 62 Singkawang Jl. Raya Bagak Sahwa, Bagak Sahwa, East Singkawang District, Singkawang City, West Kalimantan Province. The time in this study was carried out in the even semester of the 2022/2023 school year. The subjects in this study are all fourth grade students of SDN 62 Singkawang totaling 52 people consisting of four A and four B classes.

Data collection in this study uses test techniques and non-test techniques. The test technique used in this study is a learning outcome test. The researcher gives test questions to students, before the questions are used, the researcher conducts an instrument validity test, the data obtained from the instrument validity test can be analyzed by correlating each question item. According to Yusup (2018) if a test produces the results it is designed to produce, it is said to be valid or invalid. The SPSS program is used to analyze the data of the test results of the instrument in the form of students' critical thinking skills to determine the validity of the questions. If the validity of the instrument is valid variably, but reliability testing is still carried out. According to Widoyoko (2015), testing the validity of an instrument requires that the instrument is reliable. Before the differentiating capacity of an instrument can be assessed, its validity, reliability, and level of difficulty must be checked. According to Fatimah (2019), the ability to differentiate a question is the ability of a question to be able to distinguish between students who have mastered and have not mastered the question material being tested. After that, the level of difficulty of the question is measured whether the question is easy, medium and difficult. After conducting a post-test, the researcher used a non-test technique in the form of a questionnaire to determine the students' response to the application of the Discovery Learning learning model assisted by Pop-Up Book media.

Findings

In this section, the presentation and analysis of data related to the formulation of research problems is explained, namely to determine the influence of student learning outcomes by using the discovery learning model assisted by pop-up book learning media on the learning outcomes of the cognitive domain of fourth-grade students. The results of the study are as follows.

1. **Differences in Cognitive Learning Outcomes of Students Using the Discovery Learning Model of Pop-Up Books**

   a. Normality Test

   The normality test was carried out on the post-test data scores of the experimental class and the control class. This aims to determine the normality of the distribution of these data as a requirement for hypothesis testing. The statistical analysis used in this study is the Kolmogorof-Smirnov test which is calculated with the help of the SPSS 22 program.

   In the normality test, the researcher uses the probability parameter (sig) as a reference with the condition that if the indigo probability (sig) ≥ 0.05, the data is normally distributed. Meanwhile, if the probability value (sig) < 0.05, the data is not distributed normally.

The normality test of post-test data for the experimental class and control class can be seen in the table below.

Table 1. Results of the Normality Test

Class	Sig.	Result
Post-test kelas eksperimen (Discovery Learning)	0,000	abnormal
Post-test control class (Live Learning)	0,032	abnormal

Based on Table 4.2, the post-test data of the experimental class is not normally distributed. With these results, the test data will be further processed with non-parametric statistics (Mann-Whitney test).

b. Hypothesis Test

Student learning outcomes in science learning with a discovery learning model assisted by pop-up book media.

H_o :   There was no difference in the cognitive learning outcomes of students who used the Discovery Learning model with conventional learning in science learning for fourth-grade students

H_a :   There is a difference in the cognitive learning outcomes of students who use the Discovery Learning model with conventional learning in science learning for fourth-grade students

Hypothesis testing was carried out using the analysis of the Mann-Whitney test because the data was not normally distributed. The analysis of the Mann-Whitney test against the post-test will show the outline of the difference in learning outcomes between the two experimental and control classes after treatment.

Ho will be accepted if the probability value (sig) ≥ 0.05. Meanwhile, Ho will be rejected if the probability value (sig) < 0.05. The results of the Mann-Whitney test analysis can be summarized in Table 4.4.

Table 2. Calculation Results of the Mann-Whitney Test

Test Statistics[a]	
	Learning outcomes
Mann-Whitney U	59.000
Wilcoxon W	437.000
Z	-5.138
Asymp. Sig. (2-tailed)	**.000**
a. Grouping Variable: class	

Based on the output of "test Statistics", it is known that Asymp.Sig(2-tailed) is valued at 0.000. Since the value of 0.000 is less than 0.05, it can be concluded that "Alternative hypothesis (Ha) is accepted". Thus, it can be said that there is a difference in student learning outcomes between the experimental class (Discovey Learning) and the control class (Direct Learning). With this significant difference, it can be said

that "there is an influence of the Discovery Learning learning model Assisted by Pop-Up book media on the learning outcomes of students' cognitive domains".

2. **The Influence of the Discovery Learning Learning Model Assisted by Pop-Up Book Media on the Learning Outcomes of Students' Cognitive Domain on Animal Metamorphosis Materials**

After the Mann Whitney U test, the results of the discovery learning model assisted by pop-up book media were obtained on the learning outcomes of the students' cognitive domain. Furthermore, to find out how much influence the discovery learning model assisted by pop-up book media has on students' cognitive domain learning outcomes on animal metamorphosis material, the Effect Size (ES) formula is used.

Table 3. Recapitulation of Effect Size Test Results

Class	Average Score	Control Class Deviation Standards
Experiment	83	23,22
Control	47	17,93
ES	2,00	
Criterion	Tall	

Based on the Effect Size criterion, the discovery learning model assisted by pop-up book media has a high influence on students' cognitive learning outcomes of 2.00 with an ES range of > 0.8.

3. **Student Response to the Discovery Learning Model Assisted by Pop-Up Book Media**

The student response questionnaire in this study is a questionnaire that is only given to students in the experimental class to find out if there is a positive student response to the discovery learning model assisted by pop-up book media. The student response questionnaire used was in the form of positive statements and negative statements which consisted of 16 statements and consisted of 4 indicators of student response, namely: (1) Relevance, (2) Attention, (3) Satisfaction, and (4) Confidence. Students are only required to provide a check list (√) mark on one of the two options provided, namely YES and NO. The results of the percentage of student response questionnaires according to the assessment indicators are presented in Table 4.6 as follows:

Table 4. Recapitulation of Student Response Indicators

No	Incators	Percentage	Criterion
1	Relevance	96%	Very high
2	Attention	99%	Very high
3	Satisfaction	83%	Very high
4	Confident	95%	Very high
	Average	93%	Very high

Based on the results of the average calculation of student responses to the discovery learning model assisted by pop-up book media, students who answered YES as many as 93% with the aspects of relevance indicators 96%, attention 99%, satisfaction 83%, and

confidence 95%, so that they got a very high category with an average percentage of 93% with a range of 75% ≤X ≤ 100%, so that the student response was positive to the Discovery Learning learning model assisted by Pop-Up Book media that had been implemented.

Discussion

The differences in students' cognitive learning outcomes between the control class and the experimental class

The researcher conducted research at SDN 62 Singkawang which consisted of 2 classes, namely the experimental class and the control class. The experimental class came from class four B which consisted of 25 students, while the control class came from class four A consisting of 27 students. For the experimental class, the Discovery Learning learning model assisted by Pop-Up Book Media was given, while the control class was given the Direct Learning model.

After conducting the research, the researcher gave post-test questions to students to see the influence of students' cognitive learning outcomes on science learning, how much influence the Discovery Learning model assisted by Pop-Up Book media on students' cognitive domain learning outcomes on science learning and the response to the Discovery Learning learning model assisted by Pop-Up Book Media. Furthermore, the researcher calculated the results of the students' post-test to see if the experimental class that was given special treatment, namely applying the Discovery Learning model assisted by Pop-Up Book media, got better results than the control class that was only given direct learning model treatment.

Based on the results of the calculation of the post-test data of the students obtained by Asymp.Sig(2-tailed) with a value of 0.000. Since the value of 0.000 is less than 0.05, it can be concluded that the "Hypothesis is accepted". Thus, it can be said that there is a difference in student learning outcomes between the experimental class (Discovey Learning) and the control class (Direct Learning), because there is a significant difference, it can be said that "there is an influence of the Discovery Learning Learning model Assisted by Pop-Up Book media on the learning outcomes of students' cognitive domains.

In the experimental class, the Discovery Learning model is a learning that involves students in problem-solving to develop knowledge and skills (Effendi, 2012), so that during the learning process it can help students to develop thinking skills, problem-solving, and intellectual skills. This is in line with the research of Ardianto, Mulyono, & Handayani. (2019) which states that the Discovery Learning model can have a positive influence on student learning outcomes because students will be actively involved in every stage of the Discovery Learning model.

The results of the above analysis are also in accordance with those expressed by Jean Piaget and Lev Vigotsky that students construct their own understanding and students learn through interaction with more capable people or friends to solve problems that cannot be solved independently. So a person's cognitive development can be improved by arranging

the material to be studied and presenting it according to the level of development (Wicaksono, 2016: 331).

Thus, in accordance with the statements of Mutmainna and Jafar (2015), the application of the discovery learning model in elementary school, especially in science subjects, is very appropriate because this learning model has several advantages, namely 1) Increasing student experience in learning, 2) Providing opportunities for students to be closer to sources of knowledge other than books, 3) Exploring student creativity, 4) Able to increase confidence in students, and 5) Increase cooperation between students.

The Discovey Learning model in the classroom is able to provide opportunities for students to discover and apply their own ideas and teach students to be aware and consciously use their own strategies for learning. Referring to the previous descriptive data, it can be seen that the average experimental class is higher than the control class because students in the experimental class who use the Discovery Learning Assisted by Pop-up Book media model are required to be active, creative, and critical thinking in the learning process, so that students understand and understand more about the material being taught.

During learning, students are able to solve problems to develop knowledge and skills. This fact is in accordance with Bruner's theory, according to Budiningsih (2012:41) said that the learning process will run well and creatively if teachers give students the opportunity to find a concept, theory, rule, or understanding through examples that they encounter in their lives.

Learning with the Discovery Learning Model is able to increase students' experience in learning, provide opportunities for students to get closer to sources of knowledge other than books, explore students' creativity, and be able to increase students' confidence, so that by using this learning model can improve students' abilities in individuals and classroom conditions will be active and cheerful. The subject matter taught is animal metamorphosis material where students will find and solve problems with the growth process of animals such as grasshoppers, butterflies, cockroaches, flies, mosquitoes, and frogs. This is supported by Bruner's theory that students will have the opportunity to think actively, creatively and critically through problem analysis supported by research and discovery activities so that the process of understanding and learning carried out by students will be more meaningful when compared to the passive learning process.

The Discovery Learning Model Assisted by Pop-Up Book Media Has a High Effect on Student Cognitive Domain Learning Outcomes

Based on the results of the calculation of student post-test data, there is a high influence of the discovery learning learning model assisted by pop-up book media on the learning outcomes of the cognitive domain getting a high category. This shows that the discovey learning model assisted by pop-up book media has a high influence on the cognitive learning outcomes of fourth-grade students in science learning. Therefore, it can be concluded that the influence of the discovery learning model assisted by po-up book media on the learning outcomes of students' cognition is high. The results of this study are in accordance with previous research conducted by Miasari, et al. (2020) stated that there was

a significant influence of the influence of the environment-assisted discovery learning learning model on the learning outcomes of science students in fifth grade Gugu I Melinggih, Payangan District, Gianyar Regency for the 2019/2020 Academic Year.

Positive student response to the application of the Discovery Learning learning model assisted by Pop-Up Book media

Student response data was obtained from a questionnaire that had been filled out by 25 fourth grade students who were one of the subjects in this study. The questionnaire contains 16 statements that have two options, namely "YES" and "NO". Each statement in the questionnaire is related to the learning that has been applied during the last four meetings. Based on the results of the average calculation of students' responses to the discovery learning model assisted by Pop-Up Book media, it shows that the response of students to the Discovery Learning learning model assisted by Pop-Up Book media is very high. The results of this study are in accordance with previous research conducted by Yuliana Fera, et al. (2020) stating that the use of the Discovery Learning model assisted by Pop-Up Book media has a positive impact on students, where students become more active and motivated to be able to participate in learning activities. When shown Pop-Up Book media in an experimental class that can accompany students to find concepts from the learning meter, the response given by students is very positive.

Conclusion

Based on the results of the calculation of research data and discussion in general, it can be concluded that the Discovery Learning model assisted by Pop-Up Book media has a high influence on the learning outcomes of the cognitive domain of fourth grade students in science learning at SDN 62 Singkawang. In accordance with the sub-sub-formulation of the research problem, it is specifically concluded as follows; 1) There was a significant difference in the learning outcomes of the cognitive domain of fourth-grade students between classes that used the Discovery Learning learning model assisted by Pop-Up Book media and classes that used the direct learning model; 2) The Discovery Learning learning model assisted by Pop-Up Book media has a high influence on the cognitive learning outcomes of fourth grade students in science learning at SDN 62 Singkawang; 3) Positive student responses to the application of the Discovery Learning learning model assisted by Pop-Up Book media.

References

Ana, N. Y. (2018). Penggunaan model pembelajaran discovery learning dalam peningkatan hasil belajaran siswa di sekolah dasar. Jurnal ilmiah pendidikan dan pembelajaran, 2(1).

Anisa, N. N., Septiana, I., & Purbiyanti, E. D. (2021). Penerapan model pembelajaran discovery learning berbantuan media interaktif untuk meningkatkan hasil belajar peserta didik di SDN 1 Kebonadem Kabupaten Kendal. Jurnal Paedagogy, 8(3), 460-466.

Aprioda, A., Setiawan, I., Rosmaiyadi, R., & Utami, C. (2021). Pembelajaran Matematika Berbantuan LKS Berbasis Discovery Learning dengan Pendekatan Kontekstual terhadap Kemampuan Komunikasi Matematis Siswa Kelas VIII. ANARGYA: Jurnal Ilmiah Pendidikan Matematika, 4(2).

Aprioda, A., Setiawan, I., Rosmaiyadi, R., & Utami, C. (2021). Pembelajaran Matematika Berbantuan LKS Berbasis Discovery Learning dengan Pendekatan Kontekstual terhadap Kemampuan Komunikasi Matematis Siswa Kelas VIII. ANARGYA: Jurnal Ilmiah Pendidikan Matematika, 4(2).

Artawan, P. G. O., Kusmariyatni, N., & Sudana, D. N. (2020). Pengaruh Model Pembelajaran Discovery Learning Terhadap Hasil Belajar IPA. Jurnal Ilmiah Pendidikan Profesi Guru, 3(3), 452-458.

Bahari, N. K. I., Darsana, I. W., & Putra, D. K. N. S. (2018). Pengaruh model discovery learning berbantuan media lingkungan alam sekitar terhadap hasil belajar IPA. Jurnal Ilmiah Sekolah Dasar, 2(2), 103-112.

Fatimah, L.U., & alfath, K. (2019). Analisis kesukaran soal, daya pembeda dan fungsi distaktor. Al-Manar.

Kristin, F., & Rahayu, D. (2016). Pengaruh penerapan model pembelajaran discovery learning terhadap hasil belajar IPS pada siswa kelas 4 SD. Scholaria: Jurnal Pendidikan Dan Kebudayaan, 6(1), 84-92.

Masturah, E. D., Mahadewi, L. P. P., & Simamora, A. H. (2018). Pengembangan media pembelajaran Pop-up Book pada mata pelajaran IPA kelas III Sekolah Dasar. Jurnal EDUTECH Undiksha, 6(2), 212-221.

Maula, L. K. (2023). Pengaruh Model Pembelajaran Problem Based Learning Terhadap Hasil Belajar Siswa Kelas V UPTD SDN Sumolawang Pada Mata Pelajaran Matematika Materi Bangun Ruang. Lencana: Jurnal Inovasi Ilmu Pendidikan, 1(4), 255-269.

Miasari, N. P., Sumantri, M., & Renda, N. T. (2020). Pengaruh Model Pembelajaran Discovery Learning Berbantuan Lingkungan Sekitar terhadap Hasil Belajar IPA. Journal for Lesson and Learning Studies, 3(2), 319-328.

Miasari, N. P., Sumantri, M., & Renda, N. T. (2020). Pengaruh Model Pembelajaran Discovery Learning Berbantuan Lingkungan Sekitar terhadap Hasil Belajar IPA. Journal for Lesson and Learning Studies, 3(2), 319-328.

Nurbudiyani, I. (2013). Pelaksanaan pengukuran ranah kognitif, afektif, dan psikomotor pada mata pelajaran IPS kelas III SD Muhammadiyah Palangkaraya. Anterior jurnal, 13(1), 88-93.

Nurmisanti, N., Kurniawan, Y., & Muliyani, R. (2020). Profile of the Interpreting Ability of Students on Static Fluid. International Journal of Multi Discipline Science (IJ-MDS), 3(1), 30-32.

Rahmah, S. (2022). Teori kognitivisme serta aplikasinya dalam pembelajaran. SKULA: Jurnal Pendidikan Profesi Guru Madrasah, 2(3), 23-34.

Rosiana, S., Rosmaiyadi, R., & Setyowati, R. (2024). Pengaruh Model PBL Berbantuan Video Animasi terhadap Hasil Belajar IPA. Scholarly Journal of Elementary School, 4(1), 82-94.

Sari, G. A., Hendriana, E. C., & Setyowati, R. (2021). Pengaruh Model Problem Based Learning Terhadap Hasil Belajar Kognitif Siswa Kelas IV Pada Pembelajaran IPA Di SD Negeri 53 Singkawang. vol, 4, 98-105.

Sari, G. A., Hendriana, E. C., & Setyowati, R. (2021). Pengaruh Model Problem Based Learning Terhadap Hasil Belajar Kognitif Siswa Kelas IV Pada Pembelajaran IPA Di SD Negeri 53 Singkawang. vol, 4, 98-105.

Setyowati, R., Sumarli, S., & Rini, N. I. (2021). Pengaruh Model Discovery Learning Terhadap Hasil Belajar IPA Kelas V SDN 3 Singkawang. Journal of Educational Review and Research, 4(2), 123-128.

Sumarli, S., Setyowati, R., & Anggreni, P. (2021). PENGARUH PENERAPAN METODE TEAM QUIZ TERHADAP HASIL BELAJAR RANAH KOGNITIF SISWA KELAS IV SD PADA MATERI SUMBER ENERGI. Journal of Educational Review and Research, 4(2), 141-146.

Uno, W. A. (2021). Pengembangan teknologi pendidikan IPA berbasis multimedia dalam meningkatkan minat belajar siswa. Cv. Cahaya Arsh Publisher & Printing.

Wanda, A., Shafira, F., Yanti, W., Khairiyah, R., & Sitompul, H. S. (2023). Analisis Kompetensi Pedagogik Guru Dalam Pembelajaran Tematik Kelas IV SDN 095550 Jl. Asahan Km. 4 Kabupaten Simalungun. Edu Cendikia: Jurnal Ilmiah Kependidikan, 3(02), 246-262.

Wibowo, M. (2023). PEMANFAATAN MEDIA POP-UP BOOK UNTUK MENINGKATKAN HASIL BELAJAR SISWA MENGENAI CIRI CIRI PUBERTAS DI KELAS 6 SD NEGERI TONJONG 05. JGuruku: Jurnal Penelitian Guru, 1(2), 309-316.

Yusuf, F. (2018). Uji validitas dan realibitas instrument penelitian kuantitatif. Jurnal Tarbiyah: Jurnal ilmiah kependidikan.